

29 CFR 1910.146



**CONFINED
SPACE
ENTRY**

What is a Confined Space?

A space that:

- Is large enough and so configured that an employee can enter bodily and perform work;
- Has limited or restricted means of entry or exit;
- Is not designed for continuous human occupancy.

Examples of Confined Spaces:

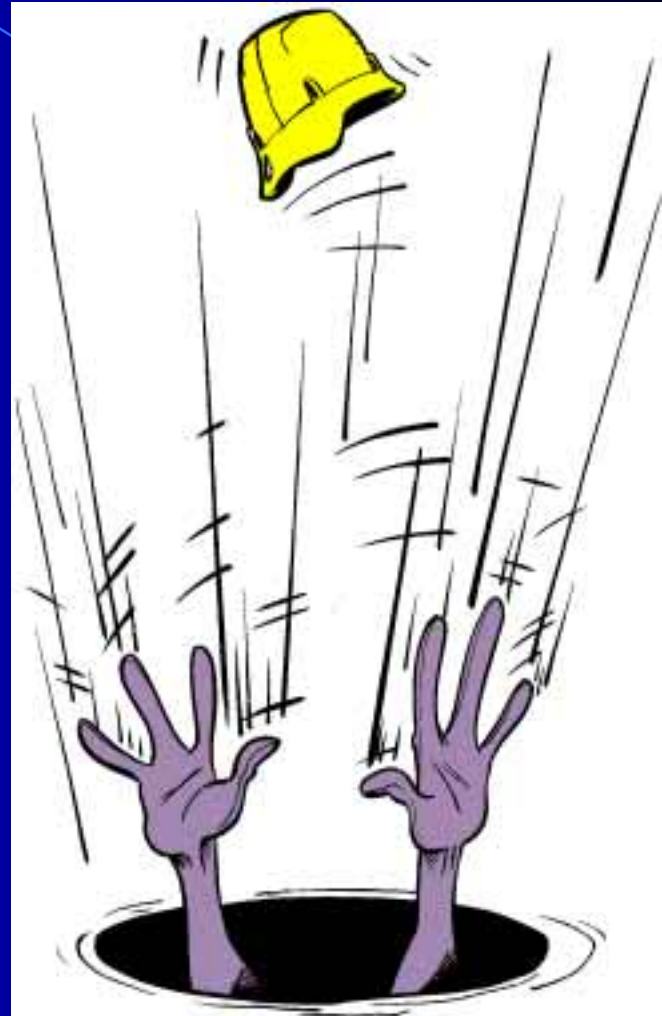
- Tanks
- Manholes
- Boilers
- Furnaces
- Sewers
- Silos
- Hoppers
- Vaults
- Pipes
- Trenches
- Tunnels
- Ducts
- Bins
- Pits

Potential Hazards in Confined Spaces

- **Oxygen Deficiency**
 - <19.5% or >23.5% oxygen concentration
- **Combustibles**
 - Methane
 - Hydrogen
 - Acetylene
 - Propane
 - Gasoline fumes
- **Toxic Materials**
 - Carbon Monoxide
 - Hydrogen Sulfide
 - Welding fumes
 - Corrosives
- **Electricity**
- **Mechanical Hazards**
 - Mixers
 - Crushers

ENTRY

- The act by which a person intentionally passes through an opening into a permit required confined space.
- Any part of the body passing through the opening is considered entry.



IDLH

- IMMEDIATELY DANGEROUS TO LIFE OR HEALTH
- Any condition which poses an immediate threat to the health of life on an entrant, or;
- Would cause irreversible adverse health effects, or;
- Would interfere with an individual's ability to escape unaided from a permit space.

ENTRANT

- The employee who will physically enter the confined space to perform the work.

ATTENDANT

- The employee who remains outside the confined space and monitors the entrant(s); guards the space against unauthorized entry; warns the entrants of any unusual conditions; and summons the rescue personnel if needed.

Permit-Required Confined Space

- A Permit-Required Confined Space is confined space that has one or more of the following characteristics:
 - Contains or has the potential to contain a hazardous atmosphere;
 - Contains a material that has the potential for engulfing an entrant;
 - Has an internal configuration such that an entrant could become trapped or asphyxiated; or
 - Contains any other serious safety or health hazard.



Entry Supervisor

- The employee responsible for coordinating the entry into the confined space. This must be a team leader or foreman.

Responsible Person

- The person directly responsible for the work being performed in the confined space. This can be the Team Leader, Foreman, journeyman, or other person qualified by training and experience.

Non-Permit Confined Space

- A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Two Options for Entering Confined Spaces:

- Permit-required confined space entry
 - For hazardous or potentially hazardous confined space work
- Non-permit confined space entry
 - For non-hazardous confined space work

Permit-Required Confined Space Entry Procedure

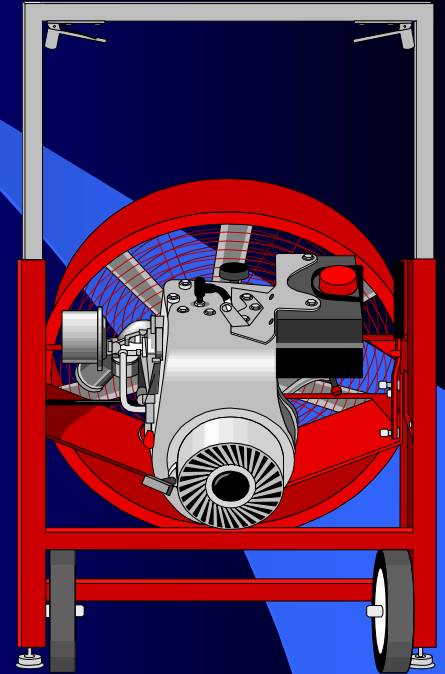
- Isolate the space
- Ventilate the space
- Conduct Tailboard
- Complete permit
- Test the atmosphere
- Enter the space

Isolate the Space from all hazards

- **Close Valves**
 - Double block & bleed, or
 - Blank flange
- **Empty the Space**
 - Depressurize, vent & drain
- **Lockout/Tagout Equipment**
 - Electrical sources
 - Rotating/reciprocating parts
 - Hazardous materials
- **Clean residue from the space**

Ventilate the Space

- **Use mechanical ventilation**
 - Fans
 - Air horns
- **Ventilate at the rate of at least four (4) volumes per hour**
 - Larger spaces require more ventilation
- **Make sure air supply is not contaminated**
 - Ventilation air supply must be from fresh air uncontaminated with flammables, toxins, etc.



Conduct a Tailboard Briefing

- Entire crew must attend
 - Attendants, entrants, entry supervisor
- Review hazards of entry and work
- Review PPE
- Review procedure for contacting rescue
 - verify rescue available
- Complete permit

Complete Entry Permit Form

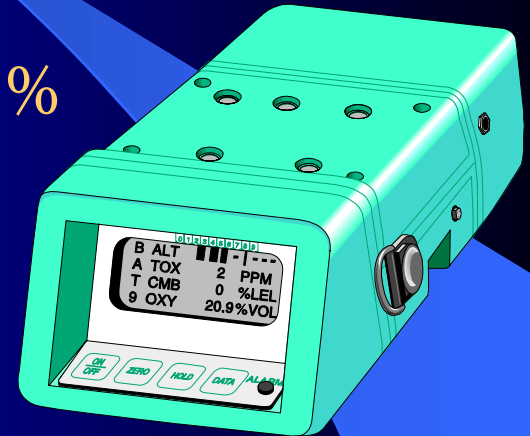
- Permit must be correctly and completely filled out prior to entry.
- Permit must be activated by Entry Supervisor's signature to be valid.
- No entry is allowed without a valid permit.
- Permits are valid for up to 12 hours.
- When work is completed, permit and tailboard form should be returned to safety.
- Cancelled permits must be kept on file for at least one year.



Test the Atmosphere

In this order:

- **Check for Oxygen Content:**
 - At least 19.5% and less than 23.5%
- **Check for Combustibles:**
 - Less than 10% of the LEL
- **Check for Toxic Gasses:**
 - Most commonly carbon monoxide (PEL <35 ppm)
 - or any other hazardous materials as determined by the use of the space.



NOTICE:

- Any time a limit is exceeded, no matter what the reason, all personnel shall immediately exit the space, and no others shall enter until atmospheric conditions are returned to safe levels.

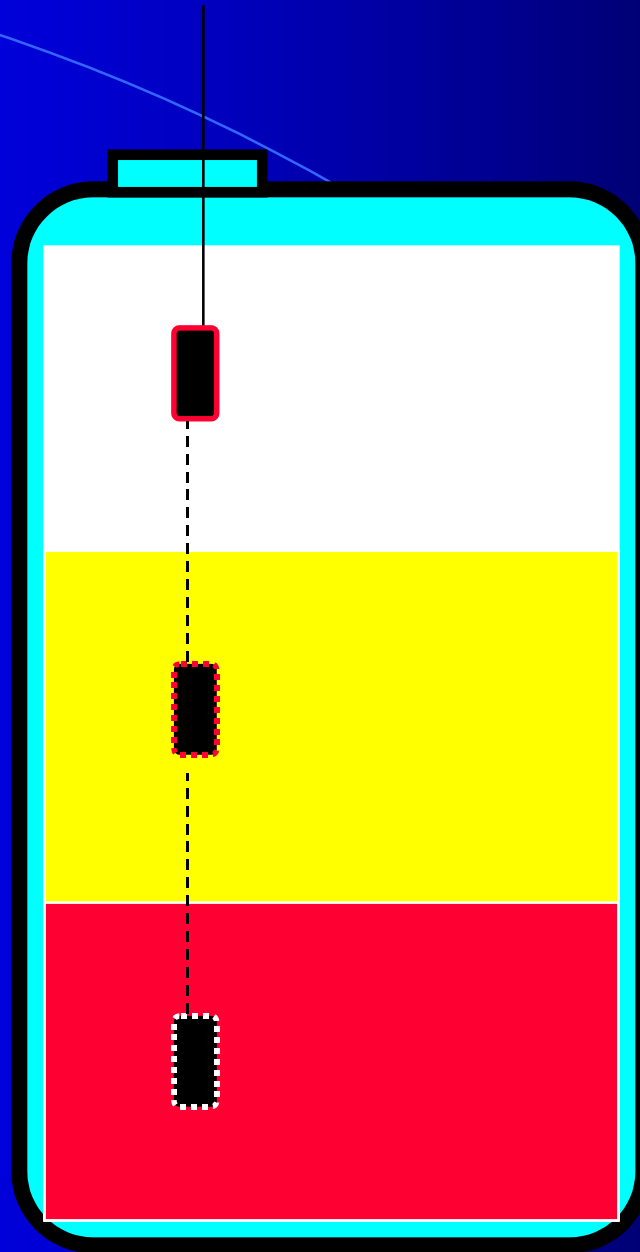
THERE ARE NO EXCEPTIONS TO THIS!

Atmosphere Testing Shall Be Performed:

- Prior to every entry when the space is vacant;
- After a 10 minute ventilation period (if ventilation is necessary);
- At least hourly for permit-required confined spaces.
- More frequently, if conditions or suspicions warrant.

**Always test the
air at various levels
to be sure that the
entire space is safe.**

**Good air near
the opening
does NOT mean
there is good air
at the bottom!**



Good Air

Poor Air

Deadly Air

Enter the Space and Proceed with work:

- **An attendant shall be posted near the entrance for the duration of the work. He shall be in constant communication with the entrants while the job is in progress.**
- **All entrants shall sign the sign in log when entering the space and sign out when exiting.**
- **The attendant shall maintain the permit and sign in log for the duration of the work.**

When the Job is Done:

- **Remove all personnel, tools, and debris from the space. Sign off the log.**
- **Close the space.**
- **Cancel the permit.**
- **Review the job with the host employer (hazards, problems, other employers, etc.)**

Non-Permit Confined Space Entry

- Isolate the space
- Ventilate the space
- Evaluate the space
 - Test atmosphere
 - Assure justification conditions are met
- Conduct tailboard
- Enter the space

Isolate the Space from all hazards

- **Close Valves**
 - Double block & bleed, or
 - Blank flange
- **Empty the Space**
 - Depressurize, vent & drain
- **Lockout/Tagout Equipment**
 - Electrical sources
 - Rotating/reciprocating parts
 - Hazardous materials
- **Clean residue from the space**

Ventilate the Space

- **Use mechanical ventilation**
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- **Ventilate at the rate of at least four (4) volumes per hour**
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 - Ventilation air supply must be from fresh air uncontaminated with flammables, toxins, etc.

Evaluate the Space

- Determine that the space meets all the conditions set forth in the non-permit justifications
- Conduct atmospheric testing
- Evaluation must be certified by Entry Supervisor's signature
- Determine that the confined space does not:
 - contain or have the potential to contain a hazardous atmosphere
 - Continuous mechanical ventilation not acceptable as good atmosphere
 - contain a material with the potential for engulfment
 - Has an internal configuration which could trap or asphyxiate, or
 - contain any recognized serious safety or health hazard

Enter the Space and Proceed with work:

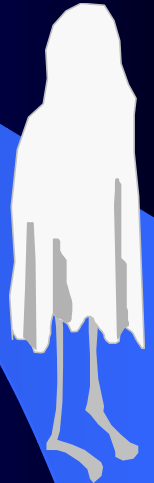
- If non-permit conditions change during the job, the space shall be immediately evacuated, and reclassified as a permit-required confined space; or conditions shall be returned to non-permit conditions and again certified as such by the entry supervisor.

Contractor Confined Space Entry

- Contractors must be informed of the hazards within the space
- Contractors must follow their own established confined space entry procedure and use their own permit forms
- Contractors must supply their own attendants
 - One attendant is acceptable for multiple companies' entrants
- Contractors must supply their own air monitors
- Contractors must review entry after completion of job

Attendant Responsibilities

- **To monitor entrants during the job and during entry & exit to help insure their safety.**
 - The attendant may not abandon his post for any reason while personnel are in the space unless relieved by another qualified attendant.
- **To monitor atmospheric conditions in the space prior to and during entry.**
- **To control access to the confined space.**
- **To summon emergency assistance as needed.**
- **To assess hazards in and around the space, and take action on the same.**
- **To keep records of confined space work, such as air test results, personnel entry/exit, etc.**

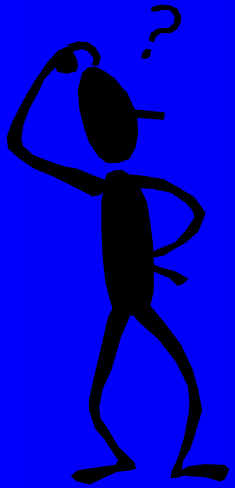


Entrant Responsibilities

- To assure that the space has been adequately ventilated, isolated, emptied, or otherwise made safe for entry.
- To immediately exit a space, without question, upon word of the attendant, no matter what the reason.
- To follow all safety rules and procedures that apply to the job.
- To be familiar with the work to be performed and the procedures that apply to the job.
- To use the appropriate PPE whenever necessary.



Supervisor Responsibilities



- To assure adequate protection is provided to the entrants by verifying adequate lockout/tagout and that all hazards are securely isolated.
- To support the attendant's authority in controlling access to a confined space.
- To verify that all personnel have exited prior to closing the space.
- To assure that all personnel involved are aware of the hazards associated with the space.
- To assure that rescue services are available prior to entry.

